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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,449

09/01/2006

Yuji Aoki

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EXAMINER

MICALI, JOSEPH

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/591,449	Applicant(s) AOKI ET AL.	
	Examiner Joseph V. Micali	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Application

Claims 1-26 are pending and presented for examination on the merit. The previous claim objections have been withdrawn in light of applicant's amendments to the claim set.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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4. Claims 1-9, 11, 19-23, and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,764,770 by Paranthaman et al, in view of US Patent Pub. No. 2004/0157747 by Chen et al.

With respect to claims 1-3, Paranthaman teaches a rare earth superconductor device comprising a metal substrate, intermediate buffer layer(s) containing Mn (and possibly Be, Mg, Ca, Sr, Ba, and Ra) with Ce, Y, Nd, Sm, Gd, Eu, Yb, Ho, Tm, Dy, or Er, and a surface layer of REBa₂Cu₃O₇ (e.g., YBCO) or other superconductor (**claim 6**).

Paranthaman does not expressly teach intermediate layers where cerium is paired with a solid solution formation element (Y, Nd, Sm, Gd, Eu, Yb, Ho, Tm, Dy, La, and Er) or a charge compensation element (Bi, Nb, Sb, Ta, and V) or both.

Chen is drawn to a superconducting product comprising a metallic substrate, a high T_c superconductor layer, and doped metal oxide buffer layer(s) (**claim 1 and paragraph 0041**). The buffer layer is further defined to comprise cerium oxide doped with possibly a transition metal oxide (such as Nb, Ta, or V), a lanthanide metal oxide (such as Sm₂O₃, Y₂O₃, or Gd₂O₃), or combinations thereof (**claims 7-8**).

Both Paranthaman and Chen are drawn to similar superconducting articles, containing a metal substrate, intermediate layer(s), and superconducting layer, both containing cerium as a preferred embodiment. At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman with cerium intermediate layers containing a solid solution formation element, a charge compensation element, or both, in view of the teaching of Chen. The suggestion or motivation for doing so would have been to improve

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property matching between superconductor layer and metal substrate as well as to prevent cracking (**paragraph 0007 and 0016**).

With regards to the limitation of critical temperature of the rare earth oxide superconductive layer, **MPEP 2112 [R-3]** states that, “[T]he discovery of a previously unappreciated property of a prior art composition, or of a scientific explanation for the prior art’s functioning, does not render the old composition patentably new to the discoverer.” The critical temperature range of 85-88° K is not patentable due to inherency of the property in the prior art of record.

With respect to claims 4 and 19-20, both Paranthaman and Chen teach a superconductor with a solid solution formation element being Y, Gd, and Sm, while Paranthaman teaches Nd, Eu, Yb, Ho, Tm, Dy, or Er as well (**Paranthaman, claim 6, and Chen, claim 8**).

With respect to claims 5 and 21-22, Chen teaches a superconductor with a charge compensation element being Nb, Ta, or V (**claim 7**), as those three elements fall into the category of transition elements.

With respect to claims 6-9 and 23, Chen teaches a superconductor with solid solution formation elements, charge compensation elements, and combinations of the two (**claims 7-8**). The detailed embodiment is through Sm, a solid solution formation element, and gives a Sm concentration of 1% to about 35% in terms of the metal content (**claim 9 and paragraph 0036**). In **MPEP 2144.05 [R-5] Obviousness of Ranges**, “In the case where the claimed ranges ‘overlap or lie inside ranges disclosed by the prior art’ a prima facie case of obviousness exists,” and thus, covers 5 to 60 mol%. As Chen discusses the use of charge compensation elements but

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gives the example of Sm to represent all the possibilities, it is inherent to use similar concentrations for charge compensation elements and combinations thereof.

With respect to claims 11 and 25-26, both Paranthaman and Chen teach a superconductor where the metal substrate is a biaxially aligned metal substrate (see **Paranthaman, claim 6, and Chen, claim 2**).

5. Claims 10 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US ‘770 by Paranthaman et al, in view of US ‘747 by Chen et al, as applied to claims 1-9, 11, 19-23, and 25-26 above, and further in view of US Patent No. 4,959,348 by Higashibata et al.

Regarding claim 10 and 24, Paranthaman in view of Chen do not explicitly teach a superconductor where the mole ratio of the charge compensation element, such as Bi or Sb, to the solid solution formation element, such as Y, is less than or equal to 1.2.

Higashibata is drawn to a superconductor where Y and Bi or Y and Sb are found in a mixture where the ratio of Sb or Bi to Y is less than 1.2 (**claim 2 and page 2, lines 17-21**).

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman and Chen with a mole ratio of charge compensation element to solid solution formation element less than or equal to 1.2, in view of the teaching of Chen. The suggestion or motivation for doing so would have been to increase the attainable current density of the superconductor (**column 1, lines 50-52**).

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6. Claims 12-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,764,770 by Paranthaman et al, in view of US Patent Pub. No. 2004/0157747 by Chen et al, and further in view of US Patent No. 5,444,040 by Kojima et al.

Chen provides a method for making a rare earth oxide superconductor including depositing a doped cerium based oxide, biaxially textured, buffer layer on a metallic substrate followed by forming an HTS layer on top of the buffer layer. The depositing step can be any process designed to form thin films, including pulsed laser deposition (PLD), sputtering, physical vapor deposition, metal organic chemical vapor deposition (MOCVD), metal organic deposition (MOD) or mixtures or combinations thereof (**paragraph 0019**). Metal substrates include Ni and alloys (**paragraph 0035**), and the reference specifies Sm-doped (0.01-0.35%) CeO₂ (**0040; 0053**). The reference specifically or inherently meets a majority of the claimed limitations. Furthermore, Chen provides the several options for depositing layers, one of which is metal organic deposition, or MOD (**paragraphs 0019, 0040**).

Together, Paranthaman and Chen do not teach a heat treatment (or calcination) step in the range of 900 to 1,200° C.

Kojima is drawn to the method of making a YBCO superconductive oxide single crystal, including a step of calcining the material at 800 to 950° C, with further heat treatment reaching but not passing 1,200° C (**claim 1**). MPEP 2144.05 [R-5] **Obviousness of Ranges** states, “In the case where the claimed ranges ‘overlap or lie inside ranges disclosed by the prior art’ a prima facie case of obviousness exists.”

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the process of Paranthaman and Chen with a heat treatment temperature range of 900

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to 1,200° C, in view of the teaching of Kojima. The suggestion or motivation for doing so would have been to provide an optimal growing temperature for sufficient melting and film formation (**Kojima, column 6, lines 10-14**).

Response to Arguments

7. Applicant's arguments filed on April 13th, 2009 have been fully considered but they are not persuasive.

With regards the rejections using Paranthaman and Chen, applicant argues several issues. The first of which is that the references do not disclose a rare earth oxide superconducting layer with critical temperature of 85-88° K (pg 10-11). However, as the prior art teaches the rest of the claimed limitations, such a property would be inherently present in the superconductor. **MPEP 2112 [R-3]** states that, “Thus the claiming of a new use, new function or unknown property which is inherently present in the prior art does not necessarily make the claim patentable.” This is an instance of claiming a property not noted in the prior art but would be inherent given the rest of the claim language. In addition, applicants provide no proof that this feature is not inherent in the reference.

The second argument is that the references do not disclose the intermediate buffer layer cerium being paired with a solid solution formation element or a charge compensation element (pg 11-12). This is not persuasive. The claim language employs the word “comprising” so it allows for such selection of an oxide of an element, as the element is still present in the product. In addition, “element”, given its broadest reasonable interpretation, is not only limited to a metal material but any material that contains a metal (i.e. oxide). It is to be noted that the claims do not

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define that the material used is only a metal (i.e. a material consisting only of a metal selected from the group consisting of...). Finally, in addition to the interpretation above, the term "types" in claims 4-5 broadly refer to the rare earth metals and compounds thereof (i.e. oxide, etc.) since there is only one type of rare earth metal (i.e. rare earth metal), thus the "types" are interpreted to read on different compounds of the metals.

With regards the rejections using Paranthaman and Chen with Higashibata (pg 12-13), applicant does not make any new grounds of argumentation that have not already been addressed *supra*.

With regards the rejections using Paranthaman and Chen with Kojima (pg 13-15), applicant argues that none of the references properly teaching employing the MOD method. However, as applicant admits, Chen does disclose knowledge and usage of the MOD method (cited in the rejection above), and thus, such a claim limitation is rendered obvious to one having ordinary skill in the art at the time the invention was made. Furthermore, applicant attacks the Kojima reference for not teaching limitations that Paranthanman and Chen were used for; thus, such argumentation is not persuasive, as the Kojima reference is used to supply knowledge in the art of a possible heat treatment range. Even though the examples of Chen might not use the MOD method, this reference does teach that it can be used and as is well known, a reference is not only limited to the teachings in the examples.

Conclusion

8. Claims 1-26 are rejected.

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9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph V. Micali whose telephone number is (571) 270-5906. The examiner can normally be reached on Monday through Friday, 7:30am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry A. Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Joseph V Micali/
Examiner, Art Unit 1793

/Michael A Marcheschi/
Primary Examiner, Art Unit 1793